

~~SECRET~~*File*
T.U.

19 August 1968

MEMORANDUM FOR THE RECORD

SUBJECT: Interim Report On The Infectious Development Experiments.

REFERENCE: [] Report Number TO-B 67-20 On Image
Analysis Dated 21 April 1967.

25X1

INTRODUCTION: The infectious development experiments suggested by []
[] as part of the image analysis program
should demonstrate that:

25X1

25X1

1. The granular nature of the developed silver halide image consists of particles much larger than the primary emulsion grain size.

2. Such large developed particles are not due to the expansion of individual grains in development but rather through clumping by infectiousness.

3. [] proposed a series of experiments which would demonstrate the infectious effect and lead to some method of reducing this phenomenon through changing developer chemistry or by physical means.

25X1

4. They believe that reduction or illimination of the infectiousness would result in lower granularity and much better resolution.

WORK COMPLETED:

1. Three separate experiments with sub-mono grain layer model emulsion number N-2-0056 exposed and developed in D-19 as outlined by [] have been submitted as completed the 16th of August 1968. I received this film the 21st of June 1968 and this work required six weeks to complete.

25X1

2. Two additional 21 density step tablets have been exposed on the sensitometer using the same N-2-0056 emulsion. One was developed in D-8 and the other in D-11 E.K. Co. solutions. This was done to provide working material for six additional experiments I intend to undertake using other developers.

~~SECRET~~GROUP 1
Excluded from automatic
downgrading and

SECRET**CONCLUSION:**

1. Of over twelve thousand undeveloped silver halide grains counted during the six weeks necessary for this work. I was unable to observe the infectious effect when the exposed sub-mono grain emulsion N-2-0056 was developed in D-19 for five minutes at 68°F. In some cases, where a very little amount of light exposed this emulsion I observed (feather or tentacle like) points reaching out from these grains in various directions at various stages of development.

2. With increased amounts of exposing light up to the point of saturation each grain, upon development, had its own degree of observed physical action. As the individual grain reduced to metallic silver a (halo like fine crystal) density surrounding it intensified until it united with the same phenomenon of other grains, gradually becoming a solid mass.

3. The statistical charts I completed for these experiments indicated to me a random effect which I could not relate to infectious development.

OBSERVATIONS AND COMMENTS:

1. Many small exposed grains remained undeveloped even though they were touching or near a large developed grain or clump of developed grains. Similarly large grains were observed to remain undeveloped when in contact with or isolated from much smaller grains that developed totally black. Some grains definitely in contact with each other, of equal size, developed one with no effect and the other totally black.

2. The observer noted that the sensitivity of the silver halide grain is somewhat affected by the shape of the grain, the surface area the grain presents to the exposing light, the angle the exposing light strikes the grain and the varying depths of the covering and binding gelatin.

3. The covering medium of gelatin was observed by means of interferometer. Photomicrographs at 600X magnification. Many observed points on the surface of the emulsion varied vertically as much as eight wave lengths of light. This irregular surface of gelatin may or may not account for some of the difficulty the developing solution has in reaching a particular grain.

4. If some way were devised to orientate similar shaped and similar sized silver halide grains in a uniform manner (like the oriented uniform crystals in a plastic polaroid filter) and cover these with a flat uniform layer of gelatin probably a more uniform development action might be obtained.

SECRET

SECRET

5. As was observed with these experiments, the developing action of D-19 solution on exposed sub-mono grain model emulsion N-2-0056 was random and not predictable. This was particularly noted when investigating developed areas that have been enlarged to 1700X magnification for statistical study. The action averages out and is not so noticeable when reading densities over larger areas at lower magnification.

FUTURE EXPERIMENTAL WORK PLANNED FOR THE COMPLETION OF THIS PROJECT:

Similar experiments using this film after processing in D-8 and D-11 developers are planned for the next weeks and should be completed by the first week in October 1968. This would serve to compare the action of three developers D-19, D-11 and D-8 on this special sub-mono grain layer model emulsion as requested. [REDACTED]

[REDACTED] requested this.

25X1
25X1
25X1

[REDACTED]
Exploratory Laboratory, TPD

Distribution:

Orig. & 1 - NPIC/TSSG/TPD/EL
1 - NPIC/TSSG/TPD

SECRET